

WHAT IS CLAIMED IS:

- 1 1. An apparatus for receiving a non-coherent layered modulation signal,
2 comprising:
3 a tuner for receiving a layered signal and producing a layered in-phase signal
4 and a layered quadrature signal therefrom;
5 an analog-to-digital converter for digitizing the layered in-phase signal and the
6 layered quadrature signal; and
7 a processor for decoding the layered in-phase signal and the layered
8 quadrature signal to produce one or more discrete layer signals.
- 1 2. The apparatus of Claim 1, wherein the processor comprises a logic
2 circuit.
- 1 3. The apparatus of Claim 1, further comprising one or more decoders,
2 each receiving and decoding one of the one or more discrete layer signals to be
3 displayed.
- 1 4. The apparatus of Claim 1, wherein decoding by the processor performs
2 frequency acquisition on the layered quadrature signal.
- 1 5. The apparatus of Claim 1, wherein decoding by the processor match
2 filters the layered in-phase signal and the layered quadrature signal.
- 1 6. The apparatus of Claim 1, wherein the processor demodulates and
2 decodes an upper layer signal from the layered in-phase signal and the layered
3 quadrature signal to produce an upper one of the one or more discrete layer signals.

1 7. The apparatus of Claim 6, wherein the processor produces an ideal
2 upper layer signal including an ideal in-phase upper layer signal and an ideal
3 quadrature upper layer signal from the decoded upper layer signal and subtracts the
4 ideal in-phase upper layer signal and the ideal quadrature upper layer signal from the
5 layered in-phase signal and the layered quadrature signal, respectively, to produce a
6 lower layer in-phase signal and a lower layer quadrature signal of a lower one of the
7 one or more discrete layer signals.

1 8. The apparatus of Claim 7, wherein the processor demodulates and
2 decodes the lower layer in-phase signal and the lower layer quadrature signal to
3 produce the lower one of the one or more discrete layer signals.

1 9. The apparatus of Claim 7, wherein the processor match filters the
2 lower layer in-phase signal and the lower layer quadrature signal.

1 10. The apparatus of Claim 7, wherein the layered in-phase signal and the
2 layered quadrature signal are delayed to synchronize the subtraction.

1 11. The apparatus of Claim 10, wherein delaying the layered in-phase
2 signal and the layered quadrature signal are delayed by correlating to the ideal in-
3 phase upper layer signal and the ideal quadrature upper layer signal.

1 12. The apparatus of Claim 7, wherein producing the ideal upper layer
2 signal comprises signal processing the ideal in-phase upper layer signal and the ideal
3 quadrature upper layer signal.

1 13. The apparatus of Claim 12, wherein signal processing the ideal in-
2 phase upper layer signal and the ideal quadrature upper layer signal comprises finite
3 impulse response matched filtering the ideal in-phase upper layer signal and the ideal
4 quadrature upper layer signal.

1 14. The apparatus of Claim 12, wherein signal processing the ideal in-
2 phase upper layer signal and the ideal quadrature upper layer signal comprises
3 applying a signal map to the ideal in-phase upper layer signal and the ideal quadrature
4 upper layer signal, the signal map accounting for transmission distortions of the
5 layered signal.

1 15. The apparatus of Claim 12, wherein signal processing the ideal in-
2 phase upper layer signal and the ideal quadrature upper layer signal comprises
3 amplitude and phase matching the ideal in-phase upper layer signal and the ideal
4 quadrature upper layer signal with the layered in-phase signal and the layered
5 quadrature signal, respectively.

1 16. A processor for decoding a layered signal into separate signal layers,
2 comprising:
3 a first demodulator and first decoder for decoding an upper layer signal from
4 the layered signal and providing the decoded upper layer signal at a first output;
5 an encoder for generating an ideal upper layer signal from the decoded upper
6 layer signal;
7 a signal processor for modifying the ideal upper layer signal to characterize
8 transmission and processing effects;
9 a subtractor for subtracting the modified ideal upper layer signal from the
10 layered signal to produce a lower layer signal; and
11 a second demodulator and second decoder for decoding the lower layer signal
12 and providing the decoded lower layer signal at a second output.

1 17. The processor of Claim 16, further comprising a delay function
2 correlated to an output of the signal processor to appropriately delay the layered signal
3 to synchronize amplitude and phase matching of the modified ideal upper layer signal
4 and the layered signal.

1 18. The processor of Claim 16, further comprising a delay function
2 correlated to an output of the signal processor to appropriately delay the layered signal
3 to synchronize subtraction of the modified ideal upper layer signal and the layered
4 signal.

1 19. The processor of Claim 16, wherein the signal processor performs
2 finite impulse response matched filtering on the ideal upper layer signal.

1 20. The processor of Claim 16, wherein the signal processor performs
2 finite impulse response matched filtering on the delayed layered signal.

1 21. The processor of Claim 16, wherein the signal processor applies a
2 signal map to the ideal upper layer signal.

1 22. The processor of Claim 16, wherein the signal processor amplitude and
2 phase matches the ideal upper layer signal with the layered signal.

1 23. A method of decoding a non-coherent layered modulation signal,
2 comprising the steps of:
3 receiving a layered signal and producing a layered in-phase signal and a
4 layered quadrature signal therefrom;
5 digitizing the layered in-phase signal and the layered quadrature signal; and
6 decoding the digitized layered in-phase signal and the layered quadrature
7 signal to produce one or more discrete layer signals.

1 24. The method of Claim 23, wherein the step of decoding is performed by
2 a logic circuit.

1 25. The method of Claim 23, wherein the step of decoding includes
2 frequency acquisition on the layered quadrature signal.

1 26. The method of Claim 23, further comprising receiving and decoding
2 each of the one or more discrete layer signals to be displayed.

1 27. The method of Claim 23, wherein the step of decoding comprises
2 matched filtering the layered in-phase signal and the layered quadrature signal.

1 28. The method of Claim 23, wherein the step of decoding comprises
2 demodulating and decoding an upper layer signal from the layered in-phase signal and
3 the layered quadrature signal to produce an upper one of the one or more discrete
4 layer signals.

1 29. The method of Claim 28, wherein the step of decoding comprises
2 producing an ideal upper layer signal including an ideal in-phase upper layer signal
3 and an ideal quadrature upper layer signal from the decoded upper layer signal and
4 subtracting the ideal in-phase upper layer signal and the ideal quadrature upper layer
5 signal from the layered in-phase signal and the layered quadrature signal, respectively,
6 to produce a lower layer in-phase signal and a lower layer quadrature signal of a lower
7 one of the one or more discrete layer signals.

1 30. The method of Claim 29, wherein the step of decoding comprises
2 demodulating and decoding the lower layer in-phase signal and the lower layer
3 quadrature signal to produce the lower one of the one or more discrete layer signals.

1 31. The method of Claim 29, wherein the step of decoding comprises
2 match filtering the lower layer in-phase signal and the lower layer quadrature signal.

1 32. The method of Claim 29, wherein the step of decoding comprises
2 delaying the layered in-phase signal and the layered quadrature signal to synchronize
3 the subtraction.

1 33. The method of Claim 32, wherein delaying comprises correlating the
2 layered in-phase signal and the layered quadrature signal are delayed by to the ideal
3 in-phase upper layer signal and the ideal quadrature upper layer signal.

1 34. The method of Claim 29, wherein producing the ideal upper layer
2 signal comprises signal processing the ideal in-phase upper layer signal and the ideal
3 quadrature upper layer signal.

1 35. The method of Claim 34, wherein signal processing the ideal in-phase
2 upper layer signal and the ideal quadrature upper layer signal comprises pulse shaping
3 the ideal in-phase upper layer signal and the ideal quadrature upper layer signal.

1 36. The method of Claim 34, wherein signal processing the ideal in-phase
2 upper layer signal and the ideal quadrature upper layer signal comprises applying a
3 signal map to the ideal in-phase upper layer signal and the ideal quadrature upper
4 layer signal, the signal map accounting for transmission distortions of the layered
5 signal.

1 37. The method of Claim 34, wherein signal processing the ideal in-phase
2 upper layer signal and the ideal quadrature upper layer signal comprises amplitude
3 and phase matching the ideal in-phase upper layer signal and the ideal quadrature
4 upper layer signal with the layered in-phase signal and the layered quadrature signal,
5 respectively.